PHYS 1902
From Our Star to the Cosmos
Winter 2019

Course Outline

Lectures:	Tuesdays and Thursdays, 19:35 – 20:55
Location:	Steacie Building 103

Instructor:	Ken Moats
Office:	Herzberg 3412
Email:	kenneth.moats@carleton.ca
Phone:	613-520-2600 ext. 5094
Office hours:	Tuesdays and Thursdays, 18:30 – 19:15 (before class) or by appointment

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Course Website:	https://culearn.carleton.ca/moodle/course/view.php?id=123303
Textbook:	*Astronomy Today*, 9th Edition by Eric Chaisson and Steve McMillan, Publisher: Pearson, ISBN: 978-0-13-451631-8.

Welcome to your first (or second) course in astronomy! I hope that you have an enjoyable winter session studying at Carleton. This course is aimed at general interest students who have had minimal exposure to science or mathematics. As such, this course will rely mostly on descriptive explanations employing diagrams and pictures to help build a heuristic understanding of the cosmos.

PHYS 1902 is one of two introductory courses on astronomy offered by Carleton. This course focuses on galaxies and stellar phenomena. I will discuss how stars form and evolve, and detail the methods astronomers and scientists use to learn about the universe on its largest scales. In this course, you will learn how to observe the sky for yourself and you will have the chance to use your new skills during observing sessions at Carleton's observatory on the roof of the Herzberg Building. I offer observing sessions at the end of each lecture (weather permitting).

By the end of PHYS 1902 you will understand the motions of the sky, how telescopes work, the characteristics and properties of stars, how galaxies form, and how scientists learn about our universe. I hope that you will gain a deeper appreciation of science and astronomy, and have fun while learning!

1. Calendar Description

Starting with the Sun, the course studies its composition and source of power, then compares our Sun with the other stars in the galaxy and beyond. Modern ideas concerning the structure, origin and evolution of the universe, pulsars and supernovae are examined. A 14-inch telescope is available for student use. Note: Science students may only take this course as a free elective. Precludes additional credit for PHYS 2203.

2. Carleton University OnLine (CUOL)

CUOL website: www.carleton.ca/cuol
Video On Demand login page: https://vod.cuol.ca/vod
CUOL Student Centre: D299 Loeb, 613-520-4055
Email: cuol@carleton.ca (general information)
Email: vod@carleton.ca (Video On Demand support and questions)

PHYS 1902 is offered through Carleton University OnLine (CUOL). Lectures are recorded during the on-campus section of the class. CUOL course lectures can be accessed in the following ways:

- CUOL live stream of the class as it is held on-campus.
- Video On Demand – online streaming/downloading of available lectures at any time ($50 fee applies per course per term). To register, add the Video On Demand section to your current registration. See the CUOL registration assistance page for more information on registering in Video On Demand. The day after you register in the Video On Demand service, log in at https://vod.cuol.ca/vod to view your lectures using your cuLearn login and password. Note that if the term has not yet started, you won't see anything listed on your Video On Demand page.
- CUOL Student Centre, D299 Loeb – free Viewing Kiosks where you can view lectures anytime. The Video On Demand viewing room is open 24 hours a day, 7 days a week (closed over the Christmas break). Bring your own headphones if you come after office hours.
- Pay per Lecture – online rental of individual lectures, fee applies.
- CUOL offers a web-cast channel which will stream recorded classes at set times. Go to the page to view the lectures and to find the schedule.

For more information see: www.carleton.ca/cuol/access-courses/

Students who live within 100 km of the Carleton University are required to collect their graded assignments from the CUOL Student Centre.

Local students write their exams at the scheduled time on campus. Distance students (living further than 100 km from campus) write midterms and exams at a distance from Carleton only if they apply for this service. Otherwise, students are expected to write all exams at Carleton. For general information on exams, schedules, service charges and deadlines, and the Distance Exam application, see: www.carleton.ca/cuol/examination-services/

3. Textbook

The required textbook is *Astronomy Today*, 9th Edition by Eric Chaisson and Steve McMillan, Publisher: Pearson, ISBN: 978-0-13-451631-8.

This is an eTextbook. An access code can be purchased online or at the University Bookstore at the University Centre. Instructions for accessing the eTextbook are posted on the PHYS 1902 cuLearn page.

4. Course Components and Marking Scheme

a. Marks and passing conditions

The marking scheme is as follows:

Assignments (4 × 8.75 %)	35 %
Independent Study	5 %
Midterm Exam	20 %
Final Exam	40 %
Course total	100 %

In order to pass the course, your overall grade must be at least 50%.

As with any university level course, it is imperative that you attend/view all lectures if you wish to succeed. The course assessment consists of four assignments, an independent study, a midterm exam, and a final exam. In this section, I explain how each assessment component factors into your final grade.

b. Lectures

There are three hours of lectures per week. Refer to Section 5 for a detailed schedule of the delivery of the material, as well as for the content and textbook chapters covered every week. The textbook is an important tool to learn the scientific material. The book identifies the learning objectives, explains the fundamental concepts and contains several review problems.

c. Assignments (35%)

There will be four assignments to be completed outside of class. I encourage collaboration with your colleagues on the assignments but I stress that collaboration does not mean copying. Please familiarize yourself with Carleton University's policies regarding plagiarism and academic honesty. You can find these policies in the Undergraduate Calendar. I hope that you will find the assignments thought provoking and fun. Don't worry if at times you get stuck – I will be more than willing to help. Remember, the process of getting unstuck is called learning.

The assignment schedule is as follows:

Assignment	Date Handed Out	Deadline
1	Thursday, January 10	Tuesday, January 29
2	Tuesday, January 29	Thursday, February 14
3	Thursday, February 14	Thursday, March 14
4	Thursday, March 14	Tuesday, April 2

Assignment Submission Policy

You can submit your assignments in one of four ways:

- Hand your assignment to me on or before the due date, either during class or during my office hours
- Submit the assignment electronically in cuLearn. **Do not email your assignment to me or the TA.**
- Mail, by Canada Post, the hard copy of your assignment to the instructor no later than the due date
- Make an arrangement to hand your assignment to the class TA before the due date

Late assignments are not accepted under any circumstances and I will assign a grade of zero. Only under the most serious of circumstances will I exempt a student from an assignment, in which case the remainder of the student's assessment will be reweighted.

d. Independent Study (5%)

I offer two observing sessions every clear night after class, at 9:00 – 10:00 p.m. and at 10:00 – 11:00 p.m. You have a wonderful opportunity to see your classroom learning brought to life through Carleton's computer-controlled 14 inch Schmidt-Cassegrain telescope. Simply by participating in 3 observing sessions throughout the term, you will earn 5% of your grade. I restrict observing sessions to a **maximum of 25 people per session**. You will find a sign-up form on the course's cuLearn page for each observing session and you will receive an email confirmation the day of your session. I will cancel observing sessions during inclement weather.

If you are a distance student or would prefer not to attend the observing sessions, you can earn 5% of your grade by writing a 1000 word essay on a selected topic. The essay is due on the last day of the Winter term, April 9, 2019, and will be assessed on a complete/incomplete basis.

e. Midterm Exam (20%)

The midterm exam will be held on **Saturday, March 2nd, 2019 at 6:30 p.m. – 8:00 p.m**. The exam will be closed-book and consist of multiple choice questions. You may bring only writing implements to the midterm exam. If you have a legitimate reason for missing the midterm exam, a deferred midterm exam will be scheduled for you. More details about the midterm exam will be announced at a later date.

Off-campus examination services are available only to eligible distance students. Only students registered in Section V and living 100 km or more away from campus are eligible to apply for distance exams. All other students are expected to come to campus to write examinations. To write the midterm exam by distance, you must register at the following link by **January 19, 2019**: https://vod.cuol.ca/distance-exam-application

f. Final Exam (40%)

The Final Exam will be held during the Winter exam period, April 12 – 27, 2019. The university will announce the date of the exam by mid-February. The exam will be closed-book and consist of multiple choice questions. You may bring only writing implements to the Final Exam. More details about the exam will be announced at a later date.

g. Deferred Exams

If you miss the Final Exam for a valid reason such as illness, you may apply for a Deferred Exam through the registrar's office. A Deferred Exam replaces only the Final Exam portion of your grade. Deferred Exams for Winter 2019 will be scheduled during May 17 – 29, 2019.

Students with significant incomplete term work, such that a failing grade would be awarded regardless of the final exam score, will not be permitted to write a deferred exam.

5. Lecture Schedule and Important Dates

Lecture	Date	Topic	Textbook Chapters
1	January 8	Course Introduction Our Place in Space	1.1
2	January 10	The Scientific Method Scientific Notation and Units in Astronomy **Assignment 1 Handed Out**	1.2, Appendices 1, 2
3	January 15	The Celestial Sphere	1.3 – 1.6
4	January 17	The Copernican Revolution	2.1 – 2.3
-	January 18	**Last day of registration for winter term courses**	-
-	January 19	**Deadline to apply to write midterm by distance**	-
5	January 22	Planetary Motion	2.4 – 2.6
6	January 24	Laws of Motion Light and Radiation	2.7 – 2.8 3.1 – 3.2
7	January 29	Light and Radiation **Assignment 1 Due** **Assignment 2 Handed Out**	3.3 – 3.5
8	January 31	Spectroscopy **Last day for a fee adjustment when withdrawing from winter term courses. Withdrawals after this date will result in a permanent notation of WDN appearing on your official transcript**	4
9	February 5	Telescopes and Instruments	5
10	February 7	The Sun, An Introduction to Stars	16
11	February 12	The Stars	17
12	February 14	The Stars **Assignment 2 Due** **Assignment 3 Handed Out**	17

-	February 18 – 22	**Winter Break. Classes are suspended.**	-
13	February 26	The Interstellar Medium	18
14	February 28	Star Formation	19
-	March 2	**Midterm Exam, 6:30 p.m. – 8:00 p.m.**	-
15	March 5	Stellar Evolution	20
16	March 7	Stellar Explosions	21
17	March 12	Neutron Stars and Black Holes	22
18	March 14	The Milky Way Galaxy **Assignment 3 Due** **Assignment 4 Handed Out**	23
19	March 19	Galaxies	24
20	March 21	Galaxies	24
21	March 26	Galaxies and Dark Matter	25
22	March 28	Cosmology	26
23	April 2	The Early Universe **Assignment 4 Due**	27
24	April 4	Course review	-
25	April 9	Course review **Optional Essay Due** **Last day for academic withdrawal from winter term courses**	-
-	April 12 – 27	Final examinations in winter term courses may be held. Examinations are normally held all seven days of the week.	-

6. Requests for Academic Accommodation

You may need special arrangements to meet your academic obligations during the term. For an accommodation request, the processes are as follows:

Pregnancy obligation
Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: **carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf**

Religious obligation
Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, visit the Equity Services website: **carleton.ca/equity/wp-content/uploads/Student-Guide-to-Academic-Accommodation.pdf**

Academic Accommodations for Students with Disabilities
If you have a documented disability requiring academic accommodations in this course, please contact the Paul Menton Centre for Students with Disabilities (PMC) at 613-520-6608 or pmc@carleton.ca for a formal evaluation or contact your PMC coordinator to send your instructor your Letter of Accommodation at the beginning of the term. You must also contact the PMC no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with your instructor as soon as possible to ensure accommodation arrangements are made. **carleton.ca/pmc**

Survivors of Sexual Violence
As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and is survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: **carleton.ca/sexual-violence-support**

Accommodation for Student Activities
Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. **https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf**

For more information on academic accommodation, please contact the departmental administrator or visit: **students.carleton.ca/course-outline**